Mechanical Ventilation: From Physiology to Clinical Practice

Toronto IDCCM Education Course

- **Course Directors:** Laurent Brochard, Ewan Goligher, Niall Ferguson
- **Organization:** IDCCM, CCCF, St Michael’s Hospital, UHN/MSH Critical Care
- **Dates:** June 2-3, 2020
- **Venue:** Virtual Meeting
- **Planning Committee:** Laurent Brochard (critical care), Ewan Goligher (critical care), Niall Ferguson (critical care), Pam Greco (respiratory therapy), Hilary Every (respiratory therapy), Michael Long (respiratory therapy), Patrick Lawler (cardiology), Alberto Goffi (critical care), Maria Kobylecki (critical care nursing)

**Recommended Readings:**

**Target Audience:**

All clinicians involved in the care of mechanically ventilated patients. Interested professionals will include physicians, respiratory therapists, nurses, physiotherapists. Experienced professionals and professionals-in-training will find this course relevant and very helpful in their clinical practice.

**Course Goals:**

1. Enhance ICU clinicians’ understanding of the physiological principles informing assessment and management of mechanical ventilation and strengthen their skills in assessing patient-ventilator interaction
2. Increase awareness of the many relevant aspects of conventional and novel invasive and non-invasive mechanical ventilation techniques
3. Enhance ICU clinicians’ knowledge of the management of specific clinical problems in mechanically ventilated patients: acute respiratory distress syndrome, chronic obstructive pulmonary disease exacerbations, and difficult weaning from mechanical ventilation.

**Course Objectives:**

By the end of the course, participants will be able to…

2. Determine why and when mechanical ventilation can be a treatment, a supportive therapy or a source of complications.
3. Describe the optimal approach to liberating patients from mechanical ventilation and conduct a comprehensive clinical assessment to identify and treat causes of difficult ventilator weaning.
4. Deliver evidence-based management of acute respiratory failure using both non-invasive and invasive ventilatory techniques for the following conditions: acute respiratory distress syndrome, chronic obstructive pulmonary disease, and weaning from mechanical ventilation.
DAY 1. PHYSIOLOGICAL PRINCIPLES

Tuesday, June 2, 8:30 am to 3:00 pm EST

1. 8 30 – 9 15. Equation of motion: pressures, volumes and flow (Laurent Brochard)

10-minute break

2. 9 25 – 10 00. Gas exchange during mechanical ventilation (Lorenzo Del Sorbo)

10-minute break

3. 10 10 – 10 35. Conventional and advanced modes of ventilation (Niall Ferguson)

10-minute break

4. 10 45 – 11 10. Patient-ventilator synchrony (Laurent Brochard)

10-minute break

5. 11 20 – 11 45. Ventilator-induced lung injury & driving pressure (Marcelo Amato)

10-minute break

6. 11 55 – 12 20. Ventilator-induced diaphragm dysfunction & myotrauma (Ewan Goligher)

55-MINUTE BREAK

7. 13 15 – 13 40. Demo 1: Measuring mechanics and lung recruitment (Lu Chen)

10-minute break

8. 13 50 – 14 10. Demo 2: Tailoring ventilation by mechanics (Laurent Brochard)

10-minute break

DAY 2. PRACTICAL APPROACH

Wednesday, June 3, 8:30 am to 3:00 pm EST

1. 8 30 – 8 55. Prone positioning and inhaled pulmonary vasodilators (Lorenzo Del Sorbo)
   
   10-minute break

2. 9 05 – 9 30. Evidence-based management of ARDS (Niall Ferguson)
   
   10-minute break

3. 9 40 – 10 15. Non-invasive ventilation and high flow nasal cannula (Tom Piraino)
   
   10-minute break

4. 10 25 – 10 50. How I do it: assessing readiness for liberation (Laurent Brochard)
   
   10-minute break

5. 11 00 – 11 25. How I do it: managing the difficult-to-liberate patient (Ewan Goligher)
   
   10-minute break

6. 11 35 – 12 00. How I do it: ventilating a COVID-19 patient (Niall Ferguson)
   
   55-MINUTE BREAK

7. 12 55 – 13 20. Sedation and analgesia for mechanical ventilation (Sangeeta Mehta)
   
   10-minute break

   
   10-minute break

9. 14 00 – 14 20. Demo 5: Assessing respiratory drive and effort (Irene Telias)
   
   10-minute break


11. 14 50 – 1500. Wrap-up (Laurent Brochard)

15 00. End of the course